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SCIENCE NEWS LETTER

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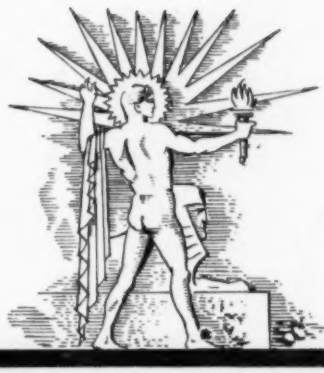
THE WEEKLY SUMMARY OF CURRENT SCIENCE •



October 14, 1939

Ears for Mars

See Page 246

A SCIENCE SERVICE PUBLICATION

Do You Know?

As a rule, larger cows produce more butterfat.

Blind stenographers take dictation in Braille, raised type.

Some of the coal miners in Belgium work in levels 4,000 feet deep.

About half of Palestine's 8,800 square miles is rated unproductive for farming.

Four-wheeled carriages were used by Etruscans of Italy in the sixth century, B. C.

Bark gets its brown color as a result of air and moisture acting on the tannins in dead cells.

The heaviest traffic total in ten years has passed through the Panama Canal during the past fiscal year.

Probably the oldest wheat samples in existence are charred grains from Jemdet Nasr, Mesopotamia, 5,500 years old.

A new kind of baby Persian melon weighing six to seven pounds and of high quality will be grown in California.

Babylon, a ruined site since about 600 A.D., had a career of almost 3,000 years under Babylonian, Greek, Persian, and Arab rule.

The turkey is an expanding crop: in 1929 America raised less than 17 million turkeys and in 1938 there were more than 26 million.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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PUBLIC HEALTH

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RADIO

How can one nation black out the broadcasts of another? p. 252.

Polish coal may compete with Pennsylvania anthracite, if Germany keeps her Polish territory long enough to start exporting the land's rich resources.

Traffic lights on a commercial truck are new in safety; when an automobile honks, the truck driver signals green, meaning all right to pass, or red, meaning danger.

The elderberry is the most popular native fruit with birds: at least 106 species of birds feed on it.

To find out the appearance of an ancient, fossil animal's brain, scientists sometimes pour liquid rubber into the brain cavity of the skull; when dry, the flexible rubber can be pulled out intact without damaging the fossil skull.

SCIENCE NEWS LETTER

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MEDICINE

Vitamins Replace Narcotics In New Treatment of Insomnia

Vitamins from Yeast and Citrus Fruit, Given as Medicine, Are Useful Sedatives for Many Kinds of Wakefulness

VITAMINS are replacing sleeping medicines in the newest treatment of insomnia or sleeplessness, reported by Dr. Louis J. Karnosh, Western Reserve School of Medicine, Cleveland. (*Journal, American Medical Association,* Sept. 30)

The vitamin treatment may, in fact, be looked on as a cure, since it attacks an underlying cause of the condition, whereas the sleeping medicines are palliative. The physician using this treatment, however, does not rely on a glass of fruit juice at bedtime to put his patient to sleep. The vitamins are given like medicine, sometimes injected into veins, and in large doses, rather than merely as part of the diet.

B_1, the anti-beriberi vitamin of yeast, and C, or ascorbic acid, the citrus fruit and tomato juice vitamin, are the ones particularly recommended in this report of the newest ways of attacking both ordinary sleeplessness and the insomnia that accompanies certain diseases, including delirium tremens.

"Vitamin B_1 should be looked on as the perfect sedative for delirium tremens," Dr. Karnosh declared.

Ascorbic acid, the vitamin C principle, is a serious rival of vitamin B_1 as the "ideal sedative" for exhaustive states, such as occur in patients with the severe thyroid disease or goiter known as thyrotoxicosis.

Ordinary insomnia, irrespective of its cause, also yields to large doses of this vitamin. This treatment produced a "sound and normal sleep," there were no undesirable after-effects and in some cases a normal sleep rhythm was established for a week or more, Dr. Karnosh says, summing up a report of another physician who treated more than 100 insomnia sufferers with the C vitamin.

Dr. Karnosh advises treatment with both vitamins B_1 and C to ward off the insomnia incidental to hardening of the brain arteries and senile decay, particularly because old people are likely to be short on vitamins. Rather than giving large and continued doses of ordinary sedatives, Dr. Karnosh believes vitamins should be used to treat sleeplessness in heart disease, in the weakness following infections, and in all exhaustion states which deplete the nervous system.

Science News Letter, October 14, 1939

POPULATION

Europe's Map Changes Complicate Census Plans

EUROPE'S changing map provides a knotty problem for planners of the United States' 1940 population census. How is the census taker, when he comes round next April, going to list the birthplace of a person—or his parents—born in Poland, say, or Austria, or some no-man's-land strip like the present Saar?

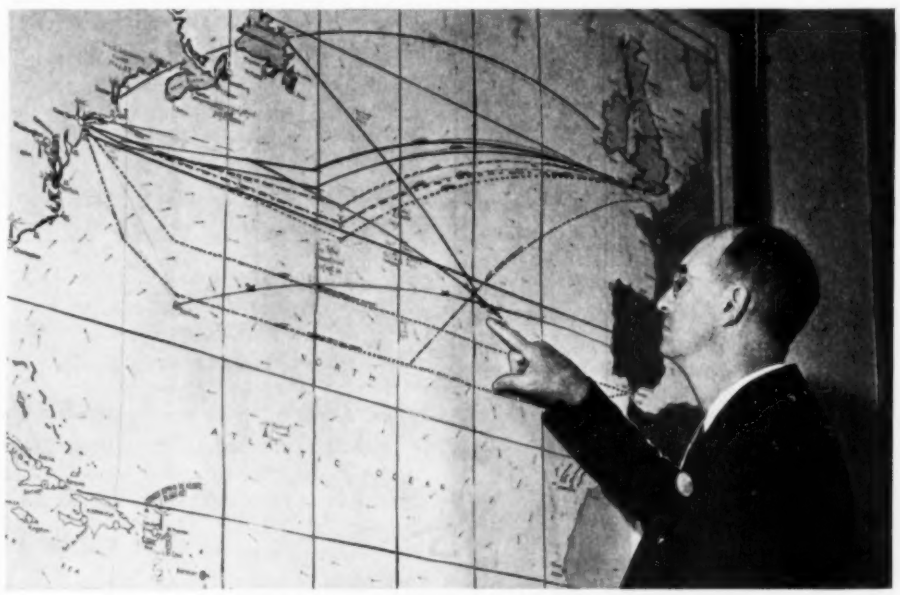
At the Bureau of the Census, officials hope to cling to their 1930 rule: "the country of birth of each person is that in which his place of birth is now located." A person from western Poland would be one more from German territory in census figures. In one house there may be two men, one born in southwest Poland in 1900 when it was Austrian, the other born there in 1921 in the Polish republic, but both must be credited according to the latest European holdings.

If the European map becomes more confused, the Bureau admits this plan may not work. It may then cut the Gordian knot by tabulating "Central Europe" as a unit.

To make European backgrounds clearer for statistical purposes, Bureau officials are considering asking each individual to name his mother tongue. Knowing the native speech of Europeans today is often more significant than placing them on a map. And since a good many Americans in certain regions speak French or other foreign languages, the mother tongue provides useful statistical data on native-born as well as foreign-born in this country. The mother tongue question will, at any rate, be used in the supplementary census schedule, which one household in about 25 may be asked to fill out.

Whatever line the Census Bureau takes with the European map, officials emphasize that this in no way involves recognition of changed boundaries by the United States.

Science News Letter, October 14, 1939



WAR DANGERS AT SEA

A "Keep-American-Ships-Out-of-Trouble" map is kept up to the minute at the U. S. Navy Hydrographic Office. Capt. George S. Bryan, Hydrographer of the Navy, is checking up on information shown on this chart of the Atlantic. In normal times, the chart shows obstructions to navigation, ships wrecked, icebergs and such menaces. Now places where ships are sunk and mines are laid are also shown.

ENGINEERING

Airplane "Mass Production" Requiring New Methods

Techniques Borrowed From Automobile and Shipbuilding Industries To Speed Production of New U. S. Aircraft

MANUFACTURE of airplanes for military and commercial use is approaching the production of automobiles in methods used if not in the actual quantities produced, it is evident from papers presented by aircraft executives and engineers attending the Fourth Annual Aircraft Production meeting of the Society of Automotive Engineers at Los Angeles.

With unfilled orders estimated at more than $275,000,000 and the Government placing military contracts larger than ever before, the industry is worrying about problems that did not arise when production was lower and not so speedy.

Because interchangeable parts are extensively used in automobile manufacture, it is taken for granted that the same methods can be used in airplane construction. Courtney J. Hertel, Douglas Aircraft assistant chief designer, explained that while parts subject to replacement are strictly interchangeable, airplane production cannot follow exactly the same system of interchangeable fabrication and assembly used in the automobile industry.

Lofting, a technique of laying out lines on a floor full-scale, borrowed from shipbuilding but greatly refined in accuracy to meet more exacting aircraft requirements, is used in making sure that the precisely molded curves of wings and fuselage are reproduced. Analytical geometry is called upon to overcome the difficulties caused by large size of parts, the prevalence of double curvature surfaces and defections.

Record For Production

A RECORD American production of 103 airplanes in one month of 23 working days was reported for August by H. F. Schwedes, assistant factory superintendent for North American Aviation, Inc. For the past six months an average of approximately 74 airplanes a month has been achieved.

In the inflationary period of 1927-29, airplane producers dreamed of building and selling airplanes the way automobiles were sold, Mr. Schwedes explained. But airplanes of five to six years ago were not suitable for quantity production. They were costly to tool and in final assembly too many men had to crowd into the small space of the fuselage. Today design aims at high performance with maximum efficiency of production.

Plane an Untried Weapon

BUILDING of airplane production plans upon the foundation established through years of hard work was urged by P. N. Jansen, factory manager of the Curtiss-Aeroplane division of Curtiss-Wright Corporation, Buffalo.

"Much is claimed, and little known, about the airplane as a defensive or offensive weapon in modern warfare between great powers," Mr. Jansen told the engineers. "We do know, however, that a great modern air force in the hands of a power can exercise a tremendous influence on the morale of its potential enemies."

Designers Kept Busy

INTENSELY rapid development and great demand for reliable performance cause many changes in aircraft engine details, Henry C. Hill, project engineer of the Wright Aeronautical Corporation, told the meeting. This rapid and continuously accelerating development does not pause long enough to make real quantity production easy.

The nine-cylinder, single row Cyclone engine in the 11 years since 1928, has increased in horsepower from 525 to 1200 without altering the basic dimensions of the design, reducing the weight per horsepower from 2 lbs. to 1.07 lbs.

Meet New Problem

BECAUSE airplane engines are about to disappear inside the wings in the interest of creating less air resistance, a major problem in aircraft design is how to construct such submerged engine installations, Wellwood E. Beall and E. G. Emery, Jr., of the Boeing Aircraft Co., told the Society.

The main problems include the design of a satisfactory propeller shaft, the satisfactory and safe disposal of exhaust gases, the cooling of the engine and its parts, and the mounting of the engine. Because of high temperatures created within the wing and the fact that 150 degrees F. is about the safe maximum limit for aluminum alloy structures, it is expected that stainless steel will be used for the structure of the airplane around the power plant installation.

Science News Letter, October 14, 1939

MEDICINE

Launch New Line of Attack On Cancer

AN ATTACK on cancer, Public Health Enemy Number Two, has been launched along new lines in Pennsylvania. The attack consists of a fact-finding campaign, expected to furnish doctors with strategic information for new and more sure-fire use of the big anti-cancer guns, surgery, X-rays and radium.

Some of the questions about cancer treatment doctors would like to have more definite answers for—answers they hope the new campaign will provide—are, for example: Is it better to operate for cancer of the lip or to use X-rays or radium? Should X-ray or radium treatment be given before operating for breast cancer or after, and if after the operation, how much time should intervene between the operation and the start of radiation treatment?

Who gets cancer, is another question the doctors want answered more exactly. Are the patients young or old, men or women, what chemical or other irritants have they been exposed to during their lives before cancer started, and how many of their ancestors had cancer? Information on the last point may help in determining the part heredity plays in cancer incidence, it is believed. Another important question to be answered is how long did the patient delay getting treatment after the cancer was first noticed?

So the State Department of Health and the Medical Society of the State of Pennsylvania have launched their campaign to get the answers. Doctors are asked to send in a complete record of every patient they treat for any kind of tumor, whether harmless or cancerous.

With the report is to go a microscopic slide with a section cut from the tumor tissue whenever this examination, called a biopsy, has been made. Full details of all treatment given the patient, and of post mortem examinations are also to be sent in. To cover the costs of the extra slide and filling in the report, for which the State Department of Health distributes special forms, fifty cents will be paid for each complete report plus microscopic slide. Names of patients will of course be kept absolutely confidential.

Science News Letter, October 14, 1939

CHEMISTRY

Germany's Planes Using Oils Made By Exclusive Method

"Voltolized" Oils Made by Treatment With New Electrical-Discharge Process Go Into Blend

SWEEPING squadrons of German fighting and bombing planes now wheeling in Europe's skies are being lubricated by oils which are made by methods commercially unavailable in the United States, it was disclosed at the meeting in Chicago of the American Oil Chemists' Society in the report of Dr. B. H. Lincoln of the Continental Oil Company.

The German oils are made by treating mineral, vegetable and animal oils with an electrical-discharge process and thus increasing their viscosity greatly. These "voltolized" oils, as they are known, are then blended with ordinary mineral oils to produce a superior airplane lubricant which has many of the valuable properties of castor oil, used during the World War, but without castor oil's handicap of stickiness.

The airplane lubricants are an outgrowth of Germany's World War conquest of Belgium, for the German occupation of that country gave them control of the then-young Elektrion Company which was just beginning to produce lubricants by subjecting oils to an electric discharge.

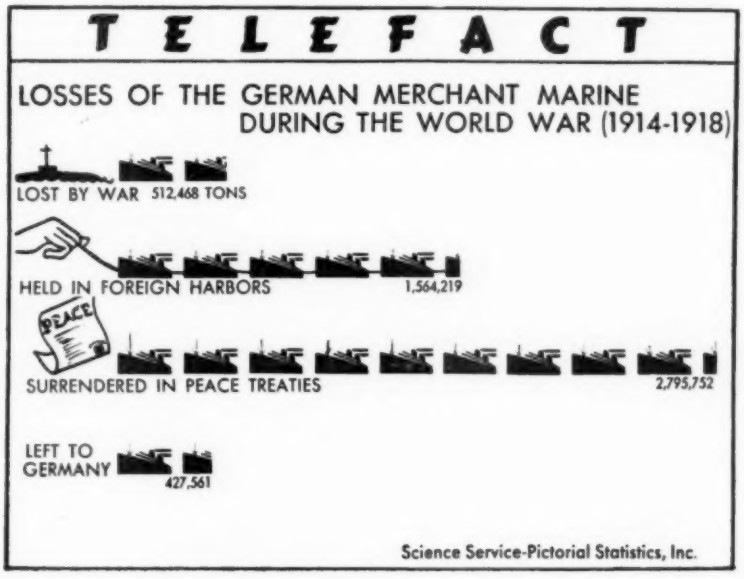
Through an agreement with Netherlands interests the process was made available to Royal Dutch Shell, worldwide Dutch petroleum corporation. Following the war, Royal Dutch Shell did extensive research on the method and perfected it until today the great KLM Dutch airliners, flying to Batavia and the East Indies, use such electrically-treated oils for lubrication. After the war the Elektrion Company in Belgium again picked up production there by this method.

The action of the electrical discharge appears to produce polymerization of the molecules of the oil (make larger molecules out of little ones) and does it without changing the essential properties which make for good lubrication, i.e. slipperiness and strength of film.

Little realized, Dr. Lincoln said in his report with G. D. Byrkit and E. W. Nelson, is the large extent to which the American petroleum industry utilizes fats and fatty acids, obtained primarily from agriculture, in producing better lubricants. Some $22,204,900 worth of fatty products are used by the petroleum industry yearly, he said.

Better oiliness, greater strength of lubricating film and less corrosion to engine parts result from the blending of small amounts of compounds of these fats from the farm into oils and greases.

Science News Letter, October 14, 1939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PEACE
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LEFT TO GERMANY 427,561
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FORESTRY

"Blitzkrieg" Plan Adopted By U. S. Forest Service

"BLITZKRIEG" methods have been adopted by U. S. Forest Service fire-fighters, materially speeding up the tempo and effectiveness of attack against the flaming enemy. The new technique is known in the Service as the "one-lick" method.

Formerly, each man on a fire-fighting line was armed with ax, rake and shovel. He was entirely responsible for his particular sector of the front, and was expected to chop down saplings, rake away debris, and scoop the ground so bare that the fire would find nothing on which to feed as it moved along.

In the "one-lick" method, the fire-fighter, like the modern infantryman, has been made a specialist, a one-weapon man. He is either an axman, a rakeman or a shovelman, just as the doughboy may be a rifleman, grenadier, machine-gunner, etc.

His job is to move forward rapidly, taking one lick at anything combustible he sees but not stopping to clean it up completely. The next man behind him will take another lick, and so on. Only when the leading axman finds himself too far out in front does he stop to take more licks, until the line catches up.

These counter-attacking shock troops move forward in furious action for 40 or 50 minutes at a time, then pause for breath until the end of the hour. The combat is very exhausting, and after three or four hours of it the front-line men are relieved by supports from the rear, while they fall back and perform less arduous duties, such as patrolling the line.

Science News Letter, October 14, 1939

MILITARY SCIENCE

Listening in on War

Microphones Find Both Submarines and Planes; Resemble Mouthpiece of Telephone; Explosions Combat Both

By DR. FRANK THONE

See Front Cover

LISTEN, then look. That is the regular procedure in "spotting" both submarines and airplanes.

There is good reason for this, in the fundamental arrangement of the human senses. Ordinarily, we can hear a sound no matter where it comes from. Our ears perceive the disturbance even if it is behind us. Then we look around, to see if we can locate it visually. We can hear in any direction, but we can see only in the direction in which we point our eyes.

The devices used for auditory pick-up of subs and planes are basically alike, much as they may differ in appearance and in details of construction. Essentially, they are microphones, like the mouthpiece of a telephone. The alert watchers on sub-chaser or at the air-defense listening post have head-sets very much like those of a telephone switchboard operator. And just as modern telephone circuits include vacuum tubes like those of a radio set, the circuits of the listening devices also include these modern electronic aids in magnifying sound.

The picturesque triple or quadruple sets of horns, looking like gigantic versions of old-fashioned ear trumpets, that are used by listeners for airplanes, are only artificial external ears that can be cocked in the direction of suspected approach, just as a rabbit or a donkey can turn his ears. Only they are more nearly perfect, mechanically, than any animal ear because they were made to order along mathematically calculated lines, not slowly evolved out of folds of skin and flesh.

Good Hearing Needed

Naturally, men with above-average hearing are selected for this task. During the World War, many blind men, with ears trained to special acuteness in compensation for loss of sight, volunteered for this service in Britain, and it is likely that such sightless soldiers are again helping their companions to locate enemies in the dark.

The great sets of horns can, of course, pick up the first faint, distant murmurs of an approaching fleet of bombers while they are still far beyond the reach of unaided ears. The operators turn the horns this way and that, until maximum loudness is registered in the head sets. Then the horizontal and vertical angles are telephoned to the searchlight position, and the long fingers of light suddenly stretch out into the sky. Hearing has gone as far as it can; looking has taken over the job.

A British military journal recently reported that automatic coordination between sound detectors and airplanes has been under experimentation. Synchronized motors keep the searchlights pointed in the same direction as the big horns, until the moment comes for switching on the lights and picking up the flying targets. If such an arrangement is really attempted, it will be necessary to apply corrections, for winds aloft, and other weather conditions, can change the apparent direction of sound. Sound waves can be blown about, as light waves can not.

For some years there has been a persistent legend that the United States has an instrument that automatically aims and fires its anti-aircraft guns at an approaching enemy, without a man anywhere near it. A robot set-up like this would be ideal, if it only existed. The only trouble is, it doesn't.

No Horns for Water

Sound detectors for submarine-hunting surface boats do not have horns, or any other kind of external ears, any more than aquatic animals like seals and frogs. They would be in the way in swimming, and they aren't needed anyway, because sound carries ever so much better in a dense medium like water than it does in thin air. Submarines are nowhere nearly as noisy as airplanes, yet the detectors pick them up just the same. Navy men declare that even with the relatively primitive models used during the World War they could sometimes even hear commands and conversations from within German U-boats.

Submarine detectors have been improved tremendously in the past two decades. A good deal of this improvement has been due to the use of devices built on exactly the same principle, and used as sonic depth finders, which chart the hills and hollows on the floor of the sea by timing a sound produced on the ship's bottom and bounced back from the sea floor as an echo. The newest sonic depth finder is able to take soundings as much as six miles straight down. That is, it can detect a sound after it has traveled twelve miles through water.

The task of seeing a submarine, after it has been located approximately by sound, is not easy. Sometimes it cannot be done at all. In that case, the only thing the sub-hunting destroyer can do is race across the area of maximum sound from underneath, dropping a whole series of depth charges.

Airplanes Help

Airplanes are valuable aids in locating submarines. From a height above the water you can see farther into the depths than you can from the deck of a boat near the surface. Try it some time, from a high mast, or a bluff overhanging the water. Observers on planes can often spot the silhouette of a submarine far beneath the surface. If they can, it's goodbye U-boat. They signal the location to the cooperating destroyer, which proceeds to drop a deadly "ash-can" right on the sub's tail. Or if need be, an airplane of the modern patrol-bomber type can drop a few depth bombs on its own account.

The depth charge was an invention mothered by the necessities of the World War. Until it was devised, there was no way to attack a U-boat except near the surface, when it could be reached by gunfire or perhaps rammed. If it managed to submerge to more than four or five fathoms, it was safe.

Then a clever young inventor took advantage of the fact that pressure under water increases uniformly with depth. He fitted a pressure diaphragm, set to operate at any desired depth, with an explosive firing mechanism, and attached the whole business to a cylinder of TNT about the size and shape of an oil drum. The "ash-can" had been born —and the U-boat's real troubles lay dead ahead.

A submarine under water is just a big bubble of air with a thin steel shell. A sudden violent push caves in that shell enough to let water pour in through

the sprung seams—and Davy Jones finds lodging for some more brave sailors.

The submarine's concussion woes began during the World War, but explosions did not become Number One enemy of airplanes until quite recently. World War anti-aircraft ammunition was shrapnel that threw showers of leaden pellets at the attacked plane, and practically had to hit the pilot to bring it down. But with the improvement of both anti-aircraft guns in range, accuracy and rapidity of fire, and especially with the change from the old undependable powder-train fuse to the much surer clockwork variety, bursts of high-explosive shell fairly close to the target became possible.

A direct hit on a plane is not necessary. If a shell bursts within 60 yards, and the flying cloud of steel fragments fails to disable the crew, the burst may disable the plane mechanically. Then all the crew can do is take to their parachutes and watch their good ship plummet to earth and crash.

Science News Letter, October 14, 1939

LISTEN, LOOK, SHOOT!

Listening devices (see cover illustration) first pick up the distant rumor of the planes' approach. Searchlights are held in leash until the last practicable moment, because when they flash out, it's a warning to the bomber that he's been detected. A few seconds after the searchlights find him, the guns blaze into action.

PUBLIC HEALTH

Nutrition Problems Topic Of Meeting Of Experts

DR. Hazel K. Stiebeling, one of the United States' best known nutrition experts, who has said, "Ill-fed people are unhappy and suspicious," is the United States' representative to Buenos Aires conferring with Latin American nutritionists on food problems of this half of the world.

Dr. Stiebeling loaded her 77-pound airplane baggage allowance with farmers' bulletins, pictorial charts, and other educational devices found effective in teaching people in this country to buy and eat wisely for good nutrition.

The meeting is an outgrowth of the League of Nations' Mixed Committee on the Problem of Nutrition, which back in 1937 appalled the world by a report declaring malnutrition was world wide. The League's committee recommended that individual countries follow up this evidence, forming their own committees and conferring.

Very little is known about Latin American countries' nutrition problems, Dr. Stiebeling says. They have not figured prominently in the data the League of Nations has been able to gather.

Science News Letter, October 14, 1939

Machinery for harvesting sugar beets is being tried out in the West.

ENGINEERING

Rivers Are Mined To Produce Anthracite Coal For Power

SOME AMERICAN communities are being supplied with heat, power and light through use of anthracite coal that in previous years was sluiced into rivers in order to get rid of it, William Lloyd, engineer of the Combustion Engineering Co. of New York, told a joint meeting of the American Institute of Mining and Metallurgical Engineers and the American Society of Mechanical Engineers at Columbus, Ohio.

"The advent of the traveling-grate stoker opened up a commercial demand for small sizes of anthracite coal that were formerly discarded as waste," said Mr. Lloyd. "As a result large culm banks are reclaimed and rivers dredged for the so-called river coal which in the early days had been sluiced to the rivers as a convenient means of disposal.

"Rivers and small streams, especially during flood conditions, become very efficient in separating the slate and other refuse inherent in the mining process from the coal, and the pockets in the stream beds 50 to 100 miles downstream from the mines are likely to contain clean coal. The streams can justly be termed very efficient jigs or flotation coal separators. Millions of tons of excellent coal have been reclaimed from rivers in the last thirty years.

"In the City of Harrisburg, Pa., alone, the central steam heating, as well as the steam power generating stations, operate entirely on river anthracite reclaimed within a few miles of the city.

"Several years ago, however, laws were passed and quite rigidly enforced, prohibiting the pollution of streams and coal mining operations adjacent to all streams were compelled to dam up and prevent any further sluicing of fines into the rivers. Despite this, the reclaiming plants continue to find sufficient material to keep operating."

Science News Letter, October 14, 1939

ENGINEERING

British Refinery Makes Gasoline and Oil From Coal

GERMANY is not the only warring nation that is making oil and gasoline, for airplanes and war machines as well as autos and trucks, from coal. Information received by the technical journal, *Power*, tells of a new British oil-from-coal refinery. Coal from the mine is converted into gasoline and heavy oil practically on the spot. Each ton of coal produces 21 gallons of crude oil, convertible into an equal volume of gasoline (petrol to Britishers) or almost equal volume of heavy oil. In addition, 1400 pounds of coalite useful as a solid fuel are obtained from each coal ton, plus by-products such as tar acids, creosote and disinfectants useful in chemical industries. The refinery handles 3400 tons of coal weekly, over 70,000 gallons of gasoline.

Science News Letter, October 14, 1939

PHYSIOLOGY

Body Fights Germ Invasion Better When It's Cold

INVASION of such dangerous germs as the streptococcus can be fought better at cool temperatures than at hot ones, Drs. Joseph W. Colvin and Clarence A. Mills, of the University of Cincinnati, found in experiments with mice. (*Science*, Sept. 22)

Even the slight difference between 65 degrees Fahrenheit and 70 degrees made a 40% difference in the ability of the animals to withstand doses of streptococci. With all other conditions such as diet, ventilation and lighting the same, 100% of mice kept in the "hot room," with a temperature of 90 degrees Fahrenheit, were dead 26 hours after injection of the germs, but only 30% of those kept at 65 degrees died in the same length of time. Of the animals kept in the control room at a temperature of 70 degrees, 60% were dead after 26 hours.

At high temperatures, the Cincinnati investigators explain, the body has trouble getting rid of heat, and the tissue combustion rate is also lowered. This results in "a sharply reduced ability to fight infectious invasion."

Energy for most physiologic functions, in man and other animals, can come only from internal combustion, but body efficiency is not high, it is pointed out, so that a large part of the combustion energy must be dissipated as waste heat.

"It is the ease or difficulty with which this waste heat can be dissipated that causes internal combustion rate to be dominated by external temperature levels," Drs. Colvin and Mills state.

Undernutrition has been known to make animals less resistant to disease germs. Drs. Colvin and Mills believe that difficulty in getting rid of body heat works in a similar fashion by making it impossible for the body to use adequately even the most perfect diet when offered in unlimited amounts.

Science News Letter, October 14, 1939

CHEMISTRY—EDUCATION

Chemical Color Reaction Used to Self-Grade Papers

THE right color note means more in examinations than in fall clothes at Kansas State College where a new system of examination grading is in vogue. If the student's answer is wrong it turns red (and so does his face). If it is correct the answer turns blue.

This method of grading, known as the Chemo-Score, was invented by two brothers, Dr. H. J. Peterson of State Teachers College, Hattiesburg, Miss., and Dr. J. C. Peterson of Kansas State College. Printed with two moisture- sensitive black inks, the correct and incorrect answer spots are initially indistinguishable, but when moistened they change color immediately. The student records his choice of answers by touching with a fountain pen which contains water instead of ink, or with a moistened paper clip, the spot which represents his chosen answer to each question. If his choice is correct the answer spot turns blue, if incorrect, it turns red.

A transparent answer sheet is used in correspondence work. To develop the answer spots on such a sheet the student dips a roughened pin in water, thrusts it through the sheet at the desired location, and works it up and down a few times. The pin is removed and the perforated spot pressed between the thumb and forefinger. This causes the color to spread.

A "Play Your Way Reader" utilizing the same principle, has also been prepared by the Peterson brothers. With practically no assistance the child eagerly "plays his way" into a reading acquaintance with 120 common words. Each line in the book contains a problem and consists of a picture and four words, one of which names the pictured object. The word in each line which names the pictured object turns red and the others turn blue. Thus, the child can test his own solution to each problem.

Science News Letter, October 14, 1939

MEDICINE

Discover Medicinal Value Of Fresh Pineapple Juice

FRESH pineapple juice has a specific medicinal value, two University of Wisconsin scientists, Julius Berger and Conrado F. Asenjo, have discovered. It contains an enzyme, bromelin, which like other enzymes, such as ficin from the sap of the fig tree, is not poisonous to man but can destroy certain types of parasitic, disease-causing worms.

Reporting their experiments (*Science*, Sept. 29) the Wisconsin investigators say that their results give a scientific basis for the use of fresh pineapple juice as an anthelmintic or worm medicine. No directions for the use of this new remedy are given, but the test-tube experiments show that fresh juice must be used as heating destroys the anti-worm activity.

Science News Letter, October 14, 1939

METALLURGY

Aluminum Finds Use Outside of Airplanes

ALUMINUM alloys are finding many structural uses outside the field of aviation, best known construction use of this light-weight, strong material.

There are now in use aluminum alloy cofferdams employed by the Corps of Engineers, U. S. Army, for emergency construction. There are aluminum bridges, giant aluminum railroad cars and even a section of an aluminum boat hull which has survived the ravages of salt water successfully for more than four years.

In a report to the American Society of Civil Engineers, D. J. Bleifuss and B. J. Fletcher of the Aluminum Company of America explain that emergency bulkheads 127 feet long and weighing 28 tons are successfully in use. On the Great Lakes is a coal bucket of aluminum with a 12.5 ton capacity. At Newport News, Va., is the prize exhibit of all, the great test section of aluminum marine hull which has withstood the ravages of feared salt water corrosion since 1935. It has received only regular marine painting.

Science News Letter, October 14, 1939

CE FIELDS

CHEMISTRY

Synthetic Camphor Breaks Japan's Near Monopoly

FOR over three decades the Japanese have produced around 90% of the world's natural camphor from camphor trees in Formosa and Japan proper, important to Japan's treasury because camphor is one of few surplus commodities yielding essential foreign exchange.

Synthetic camphor, made from turpentine, has broken the monopoly. Du Pont's plant, beginning production in 1932, is now capable in an emergency of supplying all we need for celluloid, disinfectants, drugs and explosives. Significant angle on this chemical parade: Japan, to keep up, last year began manufacture of synthetic camphor on small scale.

Science News Letter, October 14, 1939

METALLURGY

Scientists Develop New Ideas About Metals

MAN'S lack of understanding of the nature of metals is one of the high points of human ignorance. Empirically the metallurgist has learned how to make a whole host of valuable alloys out of mixtures of metals, and by adding traces of one metal to another. But why metals have the properties they do—conducting electricity, elastic, ductile, rigid, hard, soft, expansible with temperature — is virtually a complete blank in the world of knowledge.

Because it is impossible at present to develop theories for the complex metals such as carbon-iron alloys which we know as steel, the physicist now studies simple metals, like sodium, and is building up a new picture of the metallic state quite unlike the old one of the textbooks.

Ten years ago it was the fashion to "explain" the ability of most metals to conduct electricity as caused by "free" electrons of metallic atoms. Under electrical pressure (voltage) the free electrons moved through the metal and carried the current. The "free" electrons were supposed to be partially bound near the "parent" atoms.

Today, says Dr. William Shockley of the Bell Telephone Laboratories in summarizing new knowledge for the *Journal of Applied Physics,* this picture is gone. Instead the free electrons are considered truly free, wandering around in the metal until the whole metallic lattice is filled with a rather uniform "smear" of negative electricity having the properties of a gas.

The metallic ions left behind are then considered to be "floating" in this electron gas. This idealized structure may seem too flimsy to account for the known rigidity of metals but calculations based on this concept check rather well with known experimental tests.

Prize interpretation of this new theory is the explanation of the rigidity of metals and their resistance to a shearing action. Under this twisted kind of stress the ions, mutually repellent from one another, are pushed closer together. This means raising the energy, says Dr. Shockley, and "hence we should have to do work and consequently exert forces in order to strain the metal elastically. Therefore the metal will exhibit rigidity."

Science News Letter, October 14, 1939

MILITARY SCIENCE—VOLCANOLOGY

Aerial Bombing Operation Can Prevent Destruction

AN AERIAL bombing operation that prevented destruction: 20 bombs dropped in 1935 by Army aviators on the erupting lava from Mauna Loa volcano, Hawaii. They slowed the flow and saved the town of Hilo.

Italy has told Volcanologist T. A. Jaggar his protective bombing will be used on Vesuvius when and if it erupts.

Prediction: Mauna Loa should be ready for another outburst any year after this one.

Science News Letter, October 14, 1939

GENERAL SCIENCE

Universities Split Up In Fear of Air Bombardment

SOME realization of what the fear of bombs from the air is doing to science and intellectual pursuits in Europe can be gathered from the geographical scattering of various units of the University of London to other parts of the British Isles. To Wales, Cambridge, Nottingham, Oxford, Cornwall, Bristol, Sheffield, Manchester, Aberdeen, Glasgow, Edinburgh, the various colleges are moving with the students they still have. For instance, the Imperial College of Science and Technology should be addressed at Edinburgh.

Science News Letter, October 14, 1939

EDUCATION

New Kind of Invasion Is Planned by United States

A NEW KIND of invasion is being planned—a cultural expeditionary force—that will take college professors, school teachers and graduate students of various American republics into the educational citadels of sister nations of the New World.

This peaceful interchange of intellectual workers, so different from the mass invasions of war-torn Europe, is being arranged on the U.S.A. side by the Department of State and the U. S. Office of Education as the result of the Convention of Inter-American Cultural Relations, signed Dec. 23, 1936, by the United States and 20 other American republics, and ratified so far by Brazil, Chile, Costa Rica, the Dominican Republic, Guatemala, Haiti, Honduras, Nicaragua, Panama, Peru, Venezuela and the United States.

The exchange posts will be filled not only by college professors and graduate students, who are commonly eligible for such international swapping of intellectuals, but also by teachers of grade schools and high schools, who do not often get chances to participate in international educational exchange arrangements. The fields of learning covered include the humanities, natural sciences, social sciences, law, medicine, pharmacy, journalism, technology, and engineering.

Science News Letter, October 14, 1939

CHEMISTRY

Plastic Gunstocks Found Stronger Than Wood

GUNSTOCKS made of synthetic plastic material have been shown to be stronger and more durable than stocks made of the usual black walnut, in tests involving the firing of thousands of shots with the weapons kicking back against a solid block. Rubber butt plates were hammered to pieces, but the plastic stocks showed they could "take it."

The tests were made on sporting arms, but the results are considered applicable to military rifles as well. The new material thus assumes potential military importance, when it is remembered how much difficulty was experienced in getting enough seasoned black walnut for rifles in 1917-18.

The plastic tested is known as Tenite, and is a product of the Tennessee Eastman Corporation.

Science News Letter, October 14, 1939

PSYCHOLOGY

Ten Commandments Offered For Propaganda Protection

Psychologist Experts in This Field Issue Warning And Suggestions for a Psychological Armor

BEFORE the great guns, the torpedoes and the bombs went into action in the European war, propaganda battles were already being won and lost in the minds of men the world over.

The present "no-man's land" where greatest propaganda activity is focussed may very well be in American homes. Psychologists in the United States are concerned over the paradoxical condition which causes Americans to say that they do not want war but at the same time feel that they will be drawn into it against their will.

The American citizen, they conclude, needs psychological armor against the bombardment of propaganda from interested sources the world over.

Here are ten commandments of propaganda protection. They are based on a warning issued by the Council of the Society for the Psychological Study of Social Issues, a scientific organization of leading social psychologists.

It is suggested that you paste them up over your radio and keep them in mind as you hear or read dispatches from warring nations.

1. Don't think in terms of "good" nations and "bad" nations. Psychologists know that no people are completely good and others completely evil.

2. Don't think of nations as individual persons. Germany is not Hitler, Poland is not Paderewski, England not Chamberlain or Queen Elizabeth.

3. Don't think of governments as having personalities. Governments cannot demand loyalty, or determine policy, or explain actions. Certain government officials do these things. In the United States, the government lies with the citizens and you are one of them.

4. Don't forget to keep your skepticism sharp. True facts are hard to discover, especially amid the confusion and emotionalism of war.

5. Don't listen to or accept one side exclusively. Remember that there are always two sides to every question.

6. Don't accept the official explanations of the propaganda agencies of belligerents. Psychologists know well that diplomats may rationalize their actions to make them seem completely right and proper. The true reasons behind such actions are not always made public.

7. Don't trust appeals to your ideals—that you must "fight for humanity," to "keep the world safe for democracy," to "stamp out" something evil. Propaganda, psychologists know, is never directed openly at the base in us. Propagandists would rouse our hate and at the same time make us think we are being noble.

8. Don't trust emotional phrases. Now is the time to be ruled by your head not your emotions.

9. Don't believe statements that "war is inevitable" or "demanded by human instincts."

10. Don't allow yourself to be emotionally stampeded into giving up free speech, civil liberties and even your personal individuality and mental health. That is the price that war may demand.

Science News Letter, October 14, 1939

GEOGRAPHY

Aland Islands in Baltic Are Another Gibraltar

THE ALAND ISLANDS, named by some forecasters as Europe's next likely trouble spot, are the Gibraltar of the Baltic.

Long a bone of contention among neighboring countries, the Alands rise out of the sea 15 miles west of Finland and 25 miles east of Sweden. Incidentally, the name Aland is pronounced either Oh-land or Au-land.

Now a part of independent Finland, the islands in the past have been shifted, along with Finland, from Swedish to Russian rule. When Finland gained independence in 1917, an Aland Island situation arose, due to the majority of the islanders being of Swedish descent and voting to secede and go with Sweden rather than remain with Finland. It took the League of Nations council and a special commission to smooth out the tension and establish the islands as part of Finland, giving them virtually autonomous government.

Highly desirable as a military base, the islands have remained unfortified except for one brief interlude in their history. The League of Nations convention in 1921, which gave them their present status, forbade militarization.

With Russia and Germany both interested in dominating the Baltic, the islands are a natural focussing point of interest. Eastward, they command the Gulf of Finland, and the possessor of the islands could bottle the Russian fleet in its Kronstadt base. Westward, they command the entrance to the Gulf of Bothnia between Sweden and Finland. Guns trained that way would make it very dangerous for ships unfriendly to the islands' possessor to carry cargoes toward Germany. Harbors of the islands offer excellent bases and hiding places.

Science News Letter, October 14, 1939

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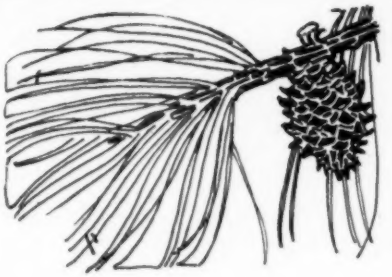
FORESTRY

NATURE RAMBLINGS
by Frank Thone



Pine Outyields Cotton

KING COTTON'S possible abdication to Prince Pine in the South has been much talked of in a general way, since it has become a part of common public information that the shrub's white lint and the tree's white wood yield the same basic material, cellulose, used now in a score of industries, from textiles and transparent wrapping materials to molded plastics and automobile lacquers.

Definite quantitative status is now given, in a preliminary way at least, by figures presented by Henry Bull of the Southern Forest Experiment Station. Mr. Bull estimates that under average growing conditions, ordinary Arkansas cotton land planted to loblolly pine will yield four and one-half times more cellulose per acre under the new crop than it did under the old.

The cotton land selected for comparison is not the best in the South, but is classified as only moderately productive, yielding about 145 pounds of lint cotton per acre. The same land, under best tree-growing conditions, can yield 3,616 pounds of dry wood per acre per year, with a net cellulose content of 1,627 pounds, or 11 times as much wood cellulose as cotton cellulose.

However, Mr. Bull admits, to compare the best that land can do in producing wood with "only average" in producing cotton is hardly fair. So he reduces the tree stand to an "only average" basis for purposes of comparison. Recent Forest Service figures show that the average wood production of trees in that general region is about 40 per cent. of the maximum possible. Applying this factor, therefore, to comparative yields, Mr. Bull shows that loblolly pine would still outyield cotton 4.5 times, in per-acre production of cellulose.

Direct comparisons may be misleading, however, Mr. Bull warns. Cotton cellulose and pine cellulose are quite different substances and have very different qualities and uses. But even so, the much greater possible production of pine cellulose on certain Southern lands would seem to make the subject worthy of very serious consideration.

Science News Letter, October 14, 1939

METEOROLOGY

Britain And France Aided By Advance Weather Data

Weather Moving From West to East Hits Western Europe Before It Reaches Nazis; Germans Lack Reports from Sea

WEATHER, which regularly migrates from west to east, is proving an ally of the Allies in the present war, as it did in 1914-1918. Britain and France know what the weather is going to be like over Germany before the Germans themselves know, and can plan their military operations accordingly.

The British and French have this private foreknowledge of German weather because they get the same weather first. Storm centers and areas of fair weather that eventually reach Germany cross Britain or France on the way, or at least some stretch of ocean patrolled by Allied warships and open to non-German commercial shipping, from all of which weather information can be obtained for Allied use but denied to Germany.

To be sure, German submarines may possibly be sending weather information home by radio, but that would be a risky procedure, with British and French destroyers and aircraft constantly on the alert to pick up any hint of a U-boat's whereabouts. And if the anti-submarine campaign succeeds completely, as the British Admiralty claims it will, even this slender source of weather information would then be lost to the Reich.

In the meantime, every effort is being made in Britain to deprive the Germans of any possible crumb of weather information. Publication and broadcasting of weather data are strictly forbidden; not even the occurrence of a local thunderstorm may be mentioned. Public forecasting in the islands has undergone a complete black-out, lest the enemy glean any helpful information from it.

Weather broadcasts are still being radioed from such places as the Azores Islands, Greenland and of course the United States; but these are too remote to give German meteorologists any real help. And the coastal countries—Belgium, the Netherlands and Denmark—are too near and too small to be of any use.

Weather knowledge has become of immense value in war. Before a major offensive is launched the general staff wants to be assured that it will not bog down in mud. Before an air raid takes off, or a naval move is undertaken, the chances of storm, cloudiness, fog and high wind must be determined. Chemical warfare is notoriously dependent on wind and the chances of rain. Meteorologists have taken the place of the augurs and soothsayers who used to go with the armies of antiquity.

Accounts of the successful British air raid on the Kiel Canal area indicate that it was timed on a knowledge of weather probabilities. The pilots' stories of taking off in clear weather, flying into rain, and swooping out of clouds to loose their bombs on German warships and shore works all suggest rather strongly that English weather men knew

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where a helpful storm area might be centered.

The converse of this story is one from World War days, of a pair of Zeppelins that started from their German base in what looked like good flying-and-bombing weather, but ran into a storm of which they had no warning and were both lost in the North Sea.

In old sailing-ship days, a fleet about to go into battle sought to get the "weather gage" of its opponent, that is, to maneuver into a position to his windward. The geographic position of England and France would seem to give them a permanent weather gage of Germany.

Science News Letter, October 14, 1939

ZOOLOGY

Three Sets of Whale Twins Reported in 1938-9 Catch

WHALE stories, via U. S. Bureau of Fisheries (although whale is mammal): Three sets of twins, rare events in whale family life, were found in the catch of U. S. whaling vessels during the 1938-39 season.

Yet unborn, two sets were finback whales and one the blue kind.

Two 96-foot whales were harpooned in the Antarctic. More oil production per foot of whale was obtained in Antarctic and Australian waters. A total of 7,156,700 gallons of oil was processed from 2,204 whales, along with 216 tons of bone and 396 tons of meat fertilizer. The total value of catch, estimated conservatively: $3,250,000.

Science News Letter, October 14, 1939

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RADIO

Europe's Radio Broadcasts Can Be Turned to Bedlam

Interference Would Work Best for Nations Having Weak Transmitters; Reception Best in North-South Direction

EUROPE'S powerful propaganda by radio between warring nations can be turned into a complete Babel of interference at any instant. This potent "weapon" in the conflict can easily be converted into a completely useless tool.

This is the verdict of radio experts at the National Bureau of Standards when informed of interference, or "radio black-outs," which cut off British news. Powerful band music from an unidentified station blocked out much of an important announcement for European listeners.

All that is needed to convert Europe's radio waves into a bedlam of squeals and whistles is for some small transmitter, in any European nation, to broadcast on the same frequency as some other station. The resulting interference destroys the effectiveness of the legitimate station.

Two can play this war of interference, of course, but it works best for a country having only weak and low cost transmitters in contrast to the elaborate powerful units of Germany, Great Britain, France and Italy.

The broadcasts of the United States to South America, a new tool of the nation to combat European propaganda broadcasts there, cannot be effectively blocked off by the interference, "black-out" technique, the government experts state. The reason is the fortunate habit of short radio waves of varying in transmission effectiveness with zones of day and night over the earth.

It will be possible for stations in the U. S. to employ short wavelengths in the daylight hours which can not be used in over-the-ocean transmission from Europe where it is then nighttime.

Moreover, in general, long-distance radio transmission is better in north-south directions than in the east-west line because the waves are moving parallel to the earth's magnetic field.

Broadcasts from Europe to America on shortwave, especially, have occasional troubles from this cause because the "great circle" path of the radio signals passes very close to the north magnetic pole of the earth which is far south of the geographical pole. Disturbances in the radio reflecting layers of the ionosphere are much greater near the magnetic poles than elsewhere.

Science News Letter, October 14, 1939

GENERAL SCIENCE

British Science Journal Is a War Casualty

SCIENCE PROGRESS, a quarterly review of scientific thought, work and affairs, now in its 34th volume, is suspending publication with its October issue because of the war conditions. This leading British science journal was edited until his death by Sir Ronald Ross, discoverer of the transmission of malaria by mosquitoes.

Science News Letter, October 14, 1939

GENERAL SCIENCE

War Takes the Soap From Babies' Gift Layettes

THE LAYETTES being sent by the American Red Cross to Europe's refugee babies will contain no baby soap. Soap is contraband.

Science News Letter, October 14, 1939

BOOKS

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ENGINEERING

American Manganese Deposits Available By New Method

A PRACTICAL way of the electrochemical extraction of the strategically important metal, manganese, from low-content domestic ores was reported to the Electrochemical Society in New York City by Drs. Colin G. Fink of Columbia University and Morris Kolodney of the City College of New York.

Except for domestic ore deposits that are so poor in manganese that extraction by conventional heat methods is impracticable, the United States is dependent upon foreign sources for this important ingredient in modern steels. The low-grade ores within the United States can be used by electrodepositing the manganese from sulfate solutions leached from them. (See also SNL, Oct. 8, 1938)

The anodes used in snatching the manganese from the solution have not been satisfactory when made of lead and iron, but Drs. Fink and Kolodney have developed an alloy anode of lead, tin and cobalt that decreases the cost of extraction and works satisfactorily.

Novel Storage Battery

A NOVEL type of storage battery, already widely used in Europe on trucks and buses, was urged upon American industry by Dr. Anna P. Hauel, New York consulting chemist.

It is a cadmium-nickel battery, said to be displacing the convenional lead batteries now widely used. It is similar but superior to the nickel-iron battery invented by Edison, Dr. Hauel declared. Following its invention in 1899 by a Swede, E. W. Jungner, the cadmium-nickel battery has been made in Europe since the beginning of the century but has been used industrially to a large extent only in the last 8 to 10 years.

Cadmium-nickel batteries are much lighter than lead batteries for the same output, they stand extreme cold more satisfactorily, hold their charge when left idle for long periods and use twice as much of their active material as lead batteries do during their discharge.

Science News Letter, October 14, 1939

METEOROLOGY

New Weather Office Tries Combined Forecasts

A NEW departure in weather forecasting is being tried at the new district office of the U. S. Weather Bureau, located at the Kansas City airport. If it works out satisfactorily it may be extended to other Weather Bureau stations throughout the country.

The new procedure consists of making aviation and general weather forecasts at the same station, by the same staff. Hitherto, aviation weather forecasts have been made by special staffs working at airports, while the general forecasts were made independently at the old downtown Weather Bureau offices.

The new system, it is hoped, will save expense through elimination of duplicate equipment and through a better scheduling of the time of the personnel. A possible drawback, which must be avoided if the new system is to function properly, might be simultaneous demands for both aviation and general forecasts.

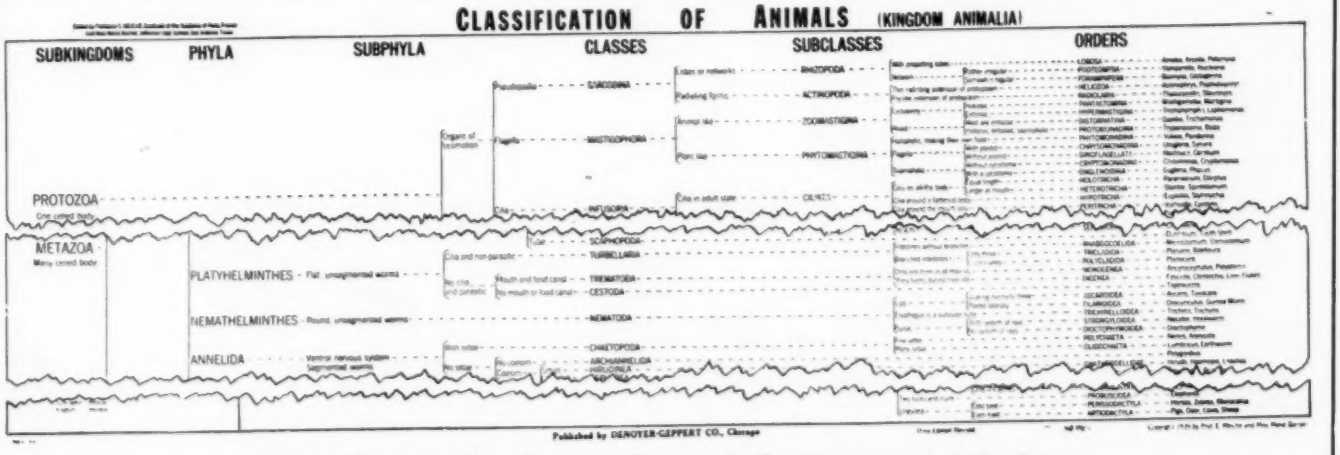
The Kansas City set-up will also include a daily "breakfast-time" radio broadcast, already popular in Washington, D. C., and Baltimore. If it works out as well as it did in those two cities, the "breakfast-time" broadcast can be expected to be extended to many other cities in the near future.

Science News Letter, October 14, 1939

● RADIO

Dr. F. B. Jewett, president of Bell Telephone Laboratories, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, October 23, 4:30 p.m., EST, 3:30 CST, 2:30 MST, 1:30 PST. Listen in on your local station. Listen in each Monday.

The goat-moth caterpillar gets its name, not from its appearance, but from its goat-like odor.



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MEDICINE

Nine Battle Lines Marked in Anti-Pneumonia War Plan

Disease Still Ranks High Among Common Causes of Death In United States and Many Other Countries; Vaccine Used

ANTI-PNEUMONIA war plans with nine battle lines marked on them appear in a new book on pneumonia by one of the anti-pneumonia war chiefs, Dr. Roderick Heffron, medical associate of the Commonwealth Fund and former director of the Massachusetts Department of Public Health pneumonia study and service.

"The disease continues to rank high among the common causes of death in this and many other countries," Dr. Heffron states, although he points out the progress made in the fight against it, especially during the last 20 or 30 years.

Sulfapyridine and other new chemical remedies have been used successfully in treating many cases of pneumonia, but more intensive study of these chemical remedies and of enzymes in treatment of pneumonia is needed. Hope of finding an outstanding chemical remedy for this ailment is greater than ever before, but the battles on this front must be fought to a finish, it is suggested.

Production of still better serums for treatment and standardization of serums for both treatment and for typing are three points in Dr. Heffron's war plans. Serum treatment has not yet been entirely replaced by chemical remedies.

Chemical remedies may become completely effective treatment for the disease, but none so far affects resistance to the invasion of pneumonia germs. A vaccine to do this appears to be at hand. Results from its use on many thousands of men in C.C.C. camps show that it is worth trying on a selected group of civilians. This is another battle line for the future.

The other four are planned to learn more about the enemy—the nature of the germs, whom they attack and when and where and which healthy persons carry them.

Science News Letter, October 14, 1939

PSYCHOLOGY—ARCHAEOLOGY

Discoveries Show Ancients Used 'War of Nerves' Too

DISCOVERY that fire-signals are as old as wars of 2000 B. C., and helped to throw ancient kings into jitters, has been made by a French scholar reading documents unearthed in a royal palace at Mari, Syria.

The first modern man to read of the war scare in the ancient capital, Georges Dossin, finds that the king of Mari was alarmed over a pending revolt of the Benjaminite tribe, and that an official scout reported that a great deal of fire-signaling was going on among the people, from town to town.

That the king was in a state of nerves from the fiery goings-on is evident in a later report, in which the official says that the Benjaminites have started their revolt, and he has been doing some fire-signaling of his own to call the king's troops to duty. Not too tactfully, the report ends:

"Perhaps these fires have made the heart of my Lord tremble. The heart of my Lord may rest in peace."

The war reports are addressed to the king's secretary, the inference being that his majesty could not read. One of the ancient military notes says in full:

"To my Lord tell this: Thus speaks your slave Banum. Yesterday from Mari I went out and towards Zuruban I carried my night's rest. All the Benjaminites lifted on high the fire signs. From Samanum to Ilum-Muluk as far as Mislan all the cities of the Benjaminites in the district of Terqa lifted up their torches in answer. So far I could not ascertain the meaning of these signs. This meaning I will ascertain now and whether it is so or not my Lord, I shall write. The watchmen of the town Mari are to be increased and my Lord should not go out beyond the walls."

The military documents have value, besides showing early use of fire-signaling for commands and messages, in that they provide evidence that Abraham lived earlier than scholars have supposed. They reveal that a tribe of Benjamin, apparently one of the 12 tribes founded by Israel's sons, was a numerous band sojourning north of Palestine as early as 2000 B. C. Since the line of descent passed from Abraham to Isaac to Jacob, or Israel, to his 12 sons, this would indicate that Abraham lived about 200 years earlier than has generally been assumed.

Science News Letter, October 14, 1939

ENGINEERING

Antarctic Snow Cruiser To Have Trial Road Trip

FIRST long trip of the Antarctic dinosaur, the snow cruiser to be used on the U. S. Antarctic expedition, will be a shake-down cruise over roads from Chicago where it was designed and built under the direction of Dr. Thomas C. Poulter at the Armour Institute of Technology's Research Foundation to Boston where it will run aboard one of the expedition's ships, setting sail toward the South Pole about Nov. 1. Before this thousand mile run, the giant land-craft will bounce over sand dunes of Indiana, closest approach to ice and snow in U. S. A. October. It will also scurry over a 15-foot ditch as a synthetic crevasse.

Science News Letter, October 14, 1939

The newest passenger sea planes weigh about 80,000 pounds when ready for trans-oceanic flight, but 200,000 pound flying boats are in prospect.

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°First Glances at New Books

Additional Reviews On Page 256

Geology

GEOMORPHOLOGY, An Introduction to the Study of Landscapes—A. K. Lobeck—*McGraw-Hill*, 731 p., $4.50. Geomorphology might be defined as the study of the forces of geology at work on the land. That is the approach of this book, which works out the story in great detail, illustrating main points with beautifully clear diagrams of developmental stages and superb photographs of landscape types. It can be read with profit not only by students of geology but by the layman who wants to know how his own home landscape "got that way."

Science News Letter, October 14, 1939

Medicine

PNEUMONIA, WITH SPECIAL REFERENCE TO PNEUMOCOCCUS LOBAR PNEUMONIA—Roderick Heffron — *Commonwealth Fund*, 1086 p., $4.50. See p. 254.

Science News Letter, October 14, 1939

Physics

SEMI-CONDUCTORS AND METALS—A. H. Wilson — *Cambridge* (*Macmillan*), 120 p., $2. The modern theory of metals and their properties which have changed greatly in the last ten years. Positive "holes," energy states of the atoms, and Brillouin zones are some of the new concepts considered in this little volume which is kept to small size because the swift research advance does not, at the present time, warrant a full-sized book that might try to "freeze" material still in a state of flux.

Science News Letter, October 14, 1939

Education

VOCATIONS FOR GIRLS—Mary Rebecca Lingenfelter and Harry Dexter Kitson—*Harcourt, Brace*, 358 p., $2.50. A book written so that the girls themselves might want to read it. The vocations considered include those for "Ladies First," "Free for All," and "For Men Only—Unless."

Science News Letter, October 14, 1939

Hygiene

HEALTH EDUCATION BY ISOTYPE—Otto Neurath and H. E. Kleinschmidt — *American Public Health Assoc.*, 31 p., 25c.

Science News Letter, October 14, 1939

Biology

FUNDAMENTALS OF BIOLOGY, Animal and Plant—William C. Beaver—*Mosby*, 896 p., $4.50. A great, big, thick book, crammed with all facts of general biology that any teacher could imaginably want his class to get acquainted with—certainly a lot more ground than the average freshman class can get over in a year. This should permit the teacher considerable latitude in selection, and give the more interested student plenty of unrequired reading if he wants it.

Science News Letter, October 14, 1939

General Science

SCIENCE TODAY AND TOMORROW—Waldemar Kaempffert—*Viking*, 275 p., $2.50. The science editor of the *New York Times* covers the wide range of science from exploding stars to democracy's relationship to the machine. Says Mr. Kaempffert in his preface: "The task of a vulgarizer of science is no longer confined to mere elementary exposition of principles and procedures. He must indicate, as best he can, what effects new discoveries and inventions are likely to have on individual and community life."

Science News Letter, October 14, 1939

Geography

LABORATORY EXERCISES IN PHYSIOGRAPHY—Gustav L. Fletcher—*Heath*, 162 p., 68 c.

Science News Letter, October 14, 1939

Zoology

THE MEXICAN AND CENTRAL AMERICAN LIZARDS OF THE GENUS SCELOPORUS—Hobart M. Smith—*Field Museum of Natural History*, 397 p., 31 pl. $3.50.

Science News Letter, October 14, 1939

History

YALE CLASSICAL STUDIES, Vol. VI—Austin M. Harmon, Alfred R. Bellinger and Henry T. Rowell, eds.—*Yale Univ. Press*, 167 p., $2. Critical and analytic discussion of half a dozen classical topics, including characters in Athenian drama and sources of the treatise De Mundo which was once attributed to Aristotle.

Science News Letter, October 14, 1939

Ethnology

NOTES ON HILLERS' PHOTOGRAPHS OF THE PAIUTE AND UTE INDIANS TAKEN ON THE POWELL EXPEDITION OF 1873—Julian H. Steward — *Smithsonian Institution*, 23 p., 31 pl., 60c. (Smithsonian Miscellaneous Collections, Vol. 98, No. 18)

Science News Letter, October 14, 1939

Sociology—Economics

MODERN MAN IN THE MAKING — Otto Neurath—*Knopf*, 159 p., $2.95. Dr. Neurath gives an intelligent explanation of the modern world and its problems, using pictorial diagrams or isotypes as part of the text, rather than as a supplement.

Science News Letter, October 14, 1939

Botany

THE EARTH'S GREEN MANTLE—Sydney Mangham—*Macmillan*, 322 p., $3.50. An easily moving, brightly written, popular book about plants, by an English professor of botany, complete and well-arranged enough to serve as a textbook, but also so interestingly presented that it can be read "for fun."

Science News Letter, October 14, 1939

Chemistry

INDEX TO THE LITERATURE OF FOOD INVESTIGATION; Vol. X, No. 4—Agnes Elisabeth Glennie, Gwen Davies and Catherine Robson, compilers — *British Library of Information*, 107 p., $1.35. This volume covers literature received between Sept. 1 and Dec. 31, 1938.

Science News Letter, October 14, 1939

Physics

INTRODUCTION TO ATOMIC PHYSICS—Henry Semat—*Farrar & Rinehart*, 360 p., $3.50. A college textbook designed for science students who have had a general college physics course and, in addition, a course in calculus. Numerous problems at the end of each chapter make the text a valuable one, and the use of the material over the past ten years in mimeographed form has given ample proof of the value and arrangement of the material.

Science News Letter, October 14, 1939

Chemistry

CHEMICAL PIONEERS—Williams Haynes—*Van Nostrand*, 288 p., $2.50. Here are the biographies of the great names in American industrial chemistry. Out of their small beginnings have come the great chemical age which the nation is now entering.

Science News Letter, October 14, 1939

Agriculture—Engineering

RURAL WATER SUPPLY AND SANITATION — Forrest B. Wright—*Wiley*, 288 p., $2.50. Clearly written and illustrated with diagrams and photographs, this textbook will be equally useful in the classroom and in the rural home or farm.

Science News Letter, October 14, 1939

Chemistry

THE CHEMISTRY OF ORGANIC COMPOUNDS (Rev. ed.)—James Bryant Conant; Rev. with the assistance of Max Tishler — *Macmillan*, 658 p., $4. The popular and well-known text of Harvard's president has been revised and extensively reworked to bring it up to present-day usefulness.

Science News Letter, October 14, 1939

*First Glances at New Books

Additional Reviews On Page 255

Population

PEOPLE, The Quantity and Quality of Population — Henry Pratt Fairchild — *Holt,* 315 p., $3. "If the birth rate of the United States should continue to decline as it has during most of the present century by about the year 1975 there would be no babies born at all" says the author, New York University professor of sociology. But don't jump at the conclusion that obstetricians will be completely out of date. Prof. Fairchild finds that the decline in our birthrate has stopped: "A closer examination of the figures shows that for the past five years our natality has held its own. What does this mean? Have the great forces that have caused the diminution in the past played themselves out? Is innate American vigor reasserting itself? May we even anticipate an upturn in the birth curve? Or is this just a temporary reversal, a mere fortuitous dent in an implacable trend? Nobody knows the answer, but everybody ought to know the tremendous implications involved in these fluctuations of population."

Science News Letter, October 14, 1939

Zoology

THE AMPHIBIA AND REPTILIA OF OREGON— Kenneth Gordon — *Oregon State College,* 82 p., 50c. A state fauna, well worked out and excellently illustrated, that should prove highly useful in the region for which it is intended.

Science News Letter, October 14, 1939

Biology

LIVING THINGS, How to Know Them —H. E. Jaques—*Published by Author, 709 North Main Street, Mt. Pleasant, Iowa*—164 p., spiral binding, $1; cloth binding, $1.80. Keys to the more important orders of plants and animals, illustrated with clean-cut little sketches. This small book has value far beyond its unpretentious size, for it is evidently based on a thorough-going practical knowledge of laboratory and field requirements.

Science News Letter, October 14, 1939

Economics

REVIEW OF WORLD TRADE, 1938 — League of Nations — *Columbia Univ. Press,* 85 p., 60c.

Science News Letter, October 14, 1939

Botany

WILD FLOWERS OF THE NORTHERN STATES AND CANADA — Arthur Craig Quick—*Donohue,* 518 p., $4. A popular book describing and figuring about 600 of the commoner wild flowers of the northeastern United States and adjacent parts of Canada. Descriptions are arranged phenologically, from early spring to late autumn. Suggestions for cultivation of some of the species in wildflower gardens are also given.

Science News Letter, October 14, 1939

Geology

GEOLOGY AND ALLIED SCIENCES, A Thesaurus and a Coordination of English and German Specific and General Terms. Part I, German-English—Walter Huebner—*Veritas Press,* 405 p., $7.50. Something geologists and others interested in the earth sciences have long been waiting for: a German-English dictionary of the technical as well as the common terms used in their science and not found in either general or previously existing special dictionaries.

Science News Letter, October 14, 1939

Zoology

QUANTITATIVE ZOOLOGY—George Gaylord Simpson and Anne Roe—*McGraw-Hill,* 414 p., $4. The old definition of a biologist as "a person of scientific aspiration but insufficient mathematical preparation" has had to go by the board long ago, in such fields as genetics and physiology, and will presently have to go in ecology, too. This book should prove highly useful in training biologists of the future, who will need to use mathematics as a daily tool of their trade.

Science News Letter, October 14, 1939

Photography

FINDING NEW SUBJECTS FOR YOUR CAMERA — Jacob Deschin — *Whittlesey,* 239 p., $2.50. A book of interest to the man who has bought a camera and is looking around for something good to turn the lens on.

Science News Letter, October 14, 1939

Bacteriology

BRUCELLOSIS IN MAN AND ANIMALS—I. Forest Huddleson — *Commonwealth Fund,* 339 p., $3.50. A technical book for physicians, veterinarians and public health workers.

Science News Letter, October 14, 1939

Anatomy

AN INTRODUCTION TO HUMAN ANATOMY (2d. ed.)—Clyde Marshall—*Saunders,* 388 p., $2.50. A text which endeavors to give the student a picture of anatomical structures as living, functioning structures.

Science News Letter, October 14, 1939

General Science

MODERN SCIENCE, A Study of Physical Science in the World Today—Hyman Levy—*Knopf,* 736 p., $5. Science in the frame of our social, physical and mental life, interpreted by a leading British scientist, professor of mathematics of the Imperial College of Science and Technology, London, who sees science as a method as well as a tool. The flow of the book is: first the energy of man expressing itself partially in science, then the machine and its effect on the human mind, followed by the struggle for mental freedom and for clear expression in mathematical form, next man's adjustment to a new outlook on time and space, brought to a focus in their application to one modern problem, illumination, and finally a diagnosis, science in travail.

Science News Letter, October 14, 1939

Biography

DEMOCRACY'S NORRIS—Alfred Lief—*Stackpole,* 546 p., $3.50. Biography of a great liberal, Senator George W. Norris of Nebraska.

Science News Letter, October 14, 1939

Chemistry

INORGANIC QUANTITATIVE ANALYSIS (new ed.)—Harold A. Fales and Frederic Kenny—*Appleton-Century,* 713 p., $4.

Science News Letter, October 14, 1939

Chemistry

DISCOVERY OF THE ELEMENTS (4th ed.) —Mary Elvira Weeks—*Journal of Chemical Education,* 470 p., $3.

Science News Letter, October 14, 1939

Chemistry

FUNDAMENTALS OF CHEMISTRY AND APPLICATIONS—Charlotte A. Francis and Edna C. Morse—Macmillan, 542 p., $3.

Science News Letter, October 14, 1939

Technology

IRON BREW, A Century of American Ore and Steel—Stewart H. Holbrook—*Macmillan,* 352 p., $2.50. The steel industry and its history, a book that makes splendid background reading on this industrial field.

Science News Letter, October 14, 1939

General Science

MODERN MIRACLE MEN—J. D. Ratcliff —*Dodd, Mead,* 311 p., $3. Recent developments in medicine are told with dramatic emphasis in the first 14 chapters while advances in agriculture are told in eight chapters. You may have read some of these in recent general magazines.

Science News Letter, October 14, 1939